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CURRENT LITERATURE.

The Cayuga Flora. Part I: A catalogue of the Phænogamia growing without cultivation in the Cayuga lake basin. Bulletin of the Cornell University. vol. ii. William R. Dudley. 8vo., pp. xxx. 133. v, with 2 maps. Ithaca, 1886.

Professor Dudley has given us one of the most complete and best prepared catalogues we have seen. It may be taken as an example of careful and conscientious work, and aided, as he has been, by specialists in their own groups, every part of it becomes authoritative. The introduction of 30 pages is devoted to the consideration of such subjects as the limits of the flora and its physical characters, the lesser floras which go to make up the larger range of the catalogue, the affinities of the Cayuga flora, the primitive flora, sketch of the explorations, statistics of the catalogue, and comparison with other floras. This region was first botanically explored by Bartram (1743), followed by Kalm (1750), Pursh (1807), Thomas, Aikin, Sartwell, Gray, and others. Since that time many young botanists have aided in the work, until probably no one has ever had more material or better work at his command in the preparation of a catalogue than the author. As for the statistics of the catalogue, it includes 1160 species, 963 of which are natives. Adding the well-marked varieties the number reaches 1278. Of these 381 are Polypetalæ, 350 Gamopetalæ, 133 Apetalæ, 403 Monocotyledons, and 11 Gymnosperms. The large number of monocotyledonous species is made by the two great orders Cyperaceæ (151 species) and Gramineæ (107), while monocotyledonous genera number but 101, as against 162 polypetalous and 146 gamopetalous genera. Compositæ stand between the two orders mentioned, with 125 species, followed by Rosaceæ (69), Leguminosæ (45), etc. The largest genera are *Carex* (112), *Potamogeton* (27), *Aster* (24), *Salix* (22), *Polygonum* (20), *Solidago* (18), *Panicum* (17), *Juncus* (15), etc. *Rhexia*, *Hippuris*, *Castilleja*, and *Pogonia pendula* are reported as having disappeared. New varieties of *Cratægus coccinea* and *Naias marina* are described by the author, and *Eatonia Dudleyi*, a new species, by Dr. Vasey. The nomenclature has all been brought up to date, accompanied by necessary synonymy, and that the last convenience, even in a catalogue, may not be wanting, an index to orders and genera is appended. It was a pleasant thought that suggested cuts of the pussy-willow for a head-piece and the witch-hazel for a tail-piece, and looking over these well-printed pages one can feel confident that from pussy-willow to witch-hazel all has been well done.

Flower-Talks at Elmridge. By Ella Rodman Church. Philadelphia: Presbyterian Board of Publication. 1885. 12°. pp. 320. Illustrated.

Among the Trees at Elmridge. By the same author and publishers. 1886. pp. 412. Illustrated.

The popularly most interesting phase of botany at the present time is that which looks at correspondences and differences of homologous parts, which discovers adaptations and the means of accomplishing ends, which takes into account the habits, growth and behavior of plants, in short, that which scrutinizes every detail of the plant's structure and appearance, and constantly inquires for the reason of it as looked at from the standard of the plant's needs. It is this form of the subject—the new botany, as it is sometimes inappropriately termed—as opposed to the routine learning of the names of organs and of their shapes and positions, upon which dependence must be placed to redeem the good name of botany from the popular misapprehension that looks upon the science as having as little to do with the verities of active life as do the stories of Greek mythology.

So far as children's books are concerned, the botany which is the most attractive and serviceable in them is the kind that sets the young mind to thinking and stimulates the observation. An incidental requirement is that technical

terms should be kept as much in the background as possible, for children, and older persons as well, often gain the stultifying idea that the hard names are the chief part of the science. The first question must be, "how is it?" with the supplementary inquiry, "what advantage is it to the plant?" and the answer must be obtained directly from the plants themselves, and not through the medium of books.

Both of the books before us are designed for children, more particularly Sunday-school children, and in accordance with a too common custom, for it seems to us unwise, the characters are drawn unnaturally good and polite. Three small children and their governess talk in one book about flowers, and in the other about trees. The author assures us in the preface that the "Elmridge Series," of which the first two volumes are entitled *Birds and their Ways*, and *Flyers and Crawlers*, has been projected especially to open the eyes of the young to the natural objects about them. There is, therefore, no disagreement between the author and the critic in regard to the main objects to be accomplished; and it is a matter of interest to see how fully the aim has been attained. We quote a few lines from the middle of the first volume by way of illustration; the subject is the common blue flag or iris. The governess says:

"You will notice that while the leaves are perfectly straight the flower-stem bends this way and that, which is called *flexuous*; it is quite round, and about two feet long. The stem is also branching, and has several flowers, each with three thick *petals* that curl outward. Botanists call these thick lower petals *sepals*, or divisions of the calyx, while the three upright ones in the center are the real *petals*. The three *stamens* grow from the base of the sepals, and are concealed by the three *stigmas*; which are those three central divisions that resemble petals. The stigmas are cut in two parts at the top. Remove the petals and sepals, and you will see that these three gorgeous stigmas proceed from the same *style* and *germ*, which ripen into a three-celled *capsule*."

"I wish there weren't such hard things to remember about flowers," said Clara. "I like the flowers so much that I want to know all about them, but I mix up all the sepals and things."

"You need not, dear," replied her governess, laughing; "all that you need to remember at present is that sepals belong to the cup or bottom of a flower, and petals to the top or corolla. As Malcolm is the oldest of the party, I shall expect most of the remembering to be done by him."

Malcolm made a grimace, too, at the sepals and petals, but manfully said that he would do his best.

We fully side with the children, and see no reason why these technical terms should be used, as it seems unnecessary to introduce them just to point out the parts, and all the other information could have been as clearly expressed by the use of every-day words. We feel sure that the great botanist, Dr. Asa Gray, would agree with us, for in his account of the curious construction of this same flower, in his work *How Plants Behave*, he calls the parts "divisions, or leaves of the flower," instead of petals and sepals, as so strenuously urged in the quotation. The idea is not that technical terms should be entirely discarded, but that they should be used only where an obvious necessity exists, in reality very few being needed by the child-botanist. Fortunately for the little ones, the governess does not always feel it incumbent upon her to be so strictly "botanical," and many pleasant and instructive observations upon the history and habits of plants are scattered through the volumes.

It is pleasant to remark a noticeable freedom from scientific blunders, there being none worth mentioning, unless one takes account of a few like the loose use of the words "stigma" and "germ" in the quotation. The author is evidently upon familiar ground. What we have to regret is that she was not better acquainted with some of the features of botany referred to in the beginning of this notice, to which the juvenile work by Dr. Gray, already mentioned, may be cited as a stepping stone.

Guide to the recognition of the principal orders of Cryptogams and the commoner and more easily distinguished New England genera, with a glossary. By Frederick Leroy Sargent. Cambridge: Charles W. Sever, 1886. 12°. pp. 39, interleaved.

The author tells us in the preface that he has attempted "to bring together in systematic form and in a convenient shape such information as would enable

a student to learn to recognize a number of the commoner conspicuous genera of cryptogams." The idea is an excellent one. Probably all who are conversant with the subject will agree that our text-books have been inadequate heretofore for the needs of the student who desires to readily provide himself with some knowledge of the names and relationships of the plants he sees about him, especially of the lower forms.

The printer and the binder have done their parts well, and the text has an attractive appearance, as if it deserved its excellent setting. But the value of a *guide* lies in its usefulness when put to the test. Here is the result of our trial. The first thing that came to hand was a thalloid liverwort. Turning to the key, we find two grand divisions, "Cormophyta" and "Thallophyta." The first includes "plants in which (with few exceptions) there is a well-marked differentiation into caulome and phyllome." Our plant evidently does not fit here, unless it be one of the exceptions, which unfortunately are not enumerated, but must go into the next division, where such differentiation is not well-marked. Under this are the groups, algæ, fungi, and lichenes, and with the characters of the first of these our plant does not conflict, but turning to the descriptions of the orders of algæ, we find ourselves quite astray. Going back to the beginning again, we conclude to assume that this may be one of the exceptions hinted at in the first line of the key. This gives a choice between Phanerogamia, Pteridophyta and Bryophyta, which are distinguished by the presence or absence of seeds and fibro-vascular bundles. As our plant appears to have neither of these structures, we place it under the last division, and turning to the description of the orders, have little doubt that it goes with Marchantiaceæ. But here are only two genera (*Lunularia* and *Marchantia*), distinguished by gemmæ, which our specimen does not have. As we are still as much in the dark about the true position of the plant as when we started, we take down Underwood's *N. Amer. Hepatica* and find that it is *Conocephalus conicus*, more commonly written *Fegatella conica*, everywhere a very common liverwort.

Fearing this may not be a fair test, we take the next thing at hand, and have a white mildew on lilac leaves. There is no trouble in placing this under the fungi, and running it into the *Perisporiaceæ*, but here we find "genera not given".

These examples will serve to make clear some of the limitations of the work. (a) No guard is provided for preventing the student being led astray by non-typical forms or misinterpretation of structures. Even plain "exceptions" are not always specified. (b) When a handbook is made to cover only the more common plants of a region, the user can rarely be certain that he has not stumbled upon a plant which is omitted, and this casts a doubt upon the correctness of his work with the key. Very few plants indeed, could be omitted if every one were included that is common at some locality or other over a large region. (c) The number of orders under which the genera are given is surprisingly small. The two genera of *Characæ* are the only ones given among fresh-water algæ, and those of but three orders are given among marine algæ. Only four orders of fungi have the genera given, *Gasteromycetes*, *Hymenomycetes*, *Tremellinæ*, and *Discomycetes*, but these embrace the largest and most conspicuous of the fungi. The genera of lichens are enumerated as an independent group.

The above criticisms may be interpreted as meaning that the work does not meet the expectations raised by its title. But we may turn about and criticise the title, as too ambitious for the work it is attached to. A guide is for the use of those who do not know the way, and to serve its purpose must therefore be reliable in all cases. The present work can not be said to meet this requirement. But instead of calling this a "guide," suppose it be named an "abbreviated synopsis"—the criticisms we have made lose their force, and the work will still serve the same end the author has apparently designed it to quite as well. We think that a serviceable guide is feasible and desirable, but it must be

more elaborate than the present work, and as we have good manuals of the mosses and liverworts, it need not cover more than the thallophytes.

Professor Sargent's work will be an excellent one to place in the hands of students who are under the eye of a teacher. It will assist the student in many cases to learn something of the chief characters of the specimens he has found, and usually to learn enough for him to readily turn to some larger handbook and pursue his inquiries.

Lectures on the Physiology of Plants. By Sydney Howard Vines, M. A., D. Sc., F. R. S., Fellow and Lecturer of Christ's College, Cambridge, and Reader in Botany in the University. 8°. pp. x. 710. Cambridge: University Press. 1886. [New York: Macmillan & Co.]

In this delightful volume—delightful typographically and intellectually—Dr. Vines presents his lectures on physiology to a wider audience than can gather about his desk at Cambridge. The work of preparing these lectures for the press began in 1877, before there was "any text-book in the English language treating at all fully of the physiology of plants so as to meet the requirements of advanced students." Various delays prevented its appearance until more than six months after the publication of Dr. Goodale's admirable work with which American students are now familiar.

Assuming a previous knowledge of histology, Dr. Vines' book is purely physiological. It shows throughout its pages the influence of Michael Foster, to whom the author acknowledges his indebtedness. Undoubtedly this influence has had much to do with the excellence of the treatment. Certainly the author has given us a work on vegetable physiology which is a worthy companion to Dr. Foster's well known text-book on animal physiology.

The broad topics of the book are discussed in the following order: Structure and properties of the cell, absorption, movement of water, transpiration, food, metabolism, growth, irritability and reproduction. At first glance it would seem that too much space had been allotted to irritability, but when it is seen that under this head the author treats the relations of plants to external influences, such as light, heat and electricity, together with their movements in response to internal stimuli, of whose nature we are ignorant, the apparent disproportion vanishes. Warmly to be commended is the concluding portion of the last lecture on irritability, in which is discussed the biological significance of this property in plants.

Of the six lectures on metabolism (we are glad to substitute this well-founded physiological term for metastasis), two are specially devoted to a consideration of the "supply of energy" and the "expenditure of energy," and throughout the work the broad principles of the conservation of energy in their vital relations to the assimilative and metabolic activities of the plant are kept constantly before the mind of the reader. No one feature is more to be commended than this, for in no other work have these relations been so clearly set forth.

The last eighty-five pages contain a fine summary of the reproductive process, tracing these from their lowest terms in the protophytes to their most complicated form in the phanerogams, together with a condensed statement of the more prominent theories of reproduction.

The excellence of such a work disarms criticism. One could wish, however, that some topics had been treated in greater detail. A notable omission, for instance, is that of any account of the processes of nuclear division. The reversed use of the terms dorsal and ventral, as applied to leaves is calculated to confuse, and is of doubtful utility.

If we compare Dr. Vines' work with its only English contemporary, it will be seen at once that Dr. Goodale's book is decidedly more comprehensive, treating with greater or less fullness almost every topic of vegetable physiology, and

including innumerable things of less importance which the college student or general reader is sure to desire to know. While Dr. Vines' book lacks this somewhat encyclopedic character, it treats more elaborately the larger topics, and in a way suited only to advanced students. It therefore supplements its predecessor in such a way that no one can do without either.

NOTES AND NEWS.

PROFESSOR C. R. BARNES has returned from Cambridge to the duties of his professorship in Purdue University, Ind.

THREE NUMBERS of Cooke's British Desmids are now issued. This work forms a continuation of the author's British Fresh-water Algæ.

REV. J. M. CROMBIE begins an Index Lichenum Britannicorum in the last number of *Grevillea*, after the most recent Nylanderian arrangement.

DR. MAXWELL MASTER'S "Vegetable Teratology" has been translated into German by Mr. Udo Dammer, and published by Hässel, of Leipzig. Additional notes and wood cuts have been added.

MR. FREDERICK LEROY SARGENT has accepted the Chair of Botany in the University of Wisconsin, at Madison, which was resigned by Prof. A. B. Seymour. Mr. Sargent has already entered upon his duties.

MR. HARVEY THOMSON, for several years Professor Coulter's assistant, has accepted the professorship of botany in Hastings College, Hastings, Nebraska. His position at Wabash College has been filled by Mr. J. N. Rose.

THE ADDRESS of Mr. Carruthers, president of the biological section of the British Association at the recent Birmingham meeting, dealt with the past history of those plants which still form a portion of the existing flora.

PROF. C. S. SARGENT writes that there should be added to the published list of Dr. Engelmänn's publications (BOTANICAL GAZETTE, May, 1884) his paper on "The Genus *Euphorbia* in DeCandolle's *Prodromus*", *Am. Jour. Sci.* II. xxxiv. 288-291.

THE COMMON stink horn (*Phallus*) sometimes becomes very obnoxious when growing near dwellings. W. G. Smith, in the *Gardeners' Chronicle*, recommends trying a strong solution of carbolic acid to destroy the fungus and prevent its starting again.

CYPRIPEDIUM ARIETINUM in the mountains of China is a notable addition to an already very considerable list of disjoined species, divided between E. North America and E. Asia. It is announced by M. Franchet in *Bull. Soc. Bot. de France*, xxxiii. 206.

THE SEASON of 1885 in Nebraska and Iowa gave a heavy crop of the cluster-cup on green ash, *Æscidium Fraxini*, but the trees are almost free from it the present year. A query as to the cause of this unexpected change is raised by Professor Bessey in the last *American Naturalist*.

THE NAVAJO names of plants are treated of in an entertaining article by Dr. W. Matthews in the September *American Naturalist*. The list comprises about one hundred species, including many small or inconspicuous kinds, which it is surprising the Indians should have names for.

MR. ERWIN F. SMITH, recently assistant in the botanical laboratory of the University of Michigan, has received the appointment as assistant in the mycological section of the U. S. Department of Agriculture. He will first take up the study of the *Fusicladium* and *Morthiera* of fruit trees.

DR. HENRY LESLIE OSBORN, professor of Zoölogy in Purdue University, has undertaken the editorship of the *American Monthly Microscopical Journal* during the absence of Mr. Hitchcock in Japan. Dr. Osborn is an expert in histological manipulation, and looks upon the microscope in the true light as a means and not the end. This means that the *Journal* will be ably edited, and with special reference to useful work with the microscope.